Glossary

Actinides (elements)

The elements from Ac (actinium) with atomic number 89 to Lr (lawrencium) with atomic number 103 are grouped and referred to as the actinides. Apart from U (uranium with atomic number 92) and Pu (plutonium with atomic number 94) which play the major roles in nuclear technology, actinides that are also important in the nuclear fuel cycle, include Np (neptunium, atomic number 93), Am (americium, atomic number 95) and Cm (curium, atomic number 96) and these are referred to as minor actinides (MA).

Extractant (reagent)

The chemical operation for recovering target constituents (either molecules or ions) from an aqueous solution by contacting it with a water-immiscible organic solvent by mixing/stirring and separating only the target constituents which are soluble in the organic diluent is a process referred to as solvent extraction. When a chemical compound, which binds selectively with the target constituent, is dissolved in an organic solvent in order to improve the recovery efficiency and selectivity, the compound is referred to as an extractant, or an extraction reagent.

Diluent (n-dodecane)

With solvent extraction, an organic solvent is used to dilute the extractant to an optimum concentration and to improve the phase separation from the aqueous phase. As it is important in the nuclear field to avoid damage from any radiation and the nitric acid, a saturated paraffinic hydrocarbon such as n-dodecane is used as the diluent.

High-level waste (HLW)

In general, radioactive wastes are classified according to their level of radioactivity into low-level wastes, medium-level wastes, high-level wastes and alpha wastes, etc. The high-level waste mentioned in this research refer to those used in the reprocessing technology. This means that the HLW contains small parts of U, Pu and Np which have not been recovered during the reprocessing, large parts of the Am and Cm, and all of the fission products.

Omega Program

The Omega Program refers to a research project for the processing and disposal of HLWs that was inaugurated by the Japanese Atomic Energy Commission in 1988 and which was entitled the "Long-Term Program for the R&D of Partitioning and Transmutation Processing Technology". The aims of this program are to separate radioactive nuclides in the HLWs into multiple groups based on their half-lives and from the viewpoint of recycling resources and to transmute the long-life nuclides into short-life or non-radioactive nuclides by means of nuclear reactions. The launting of this program in Japan has encouraged researchers in other countries.

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